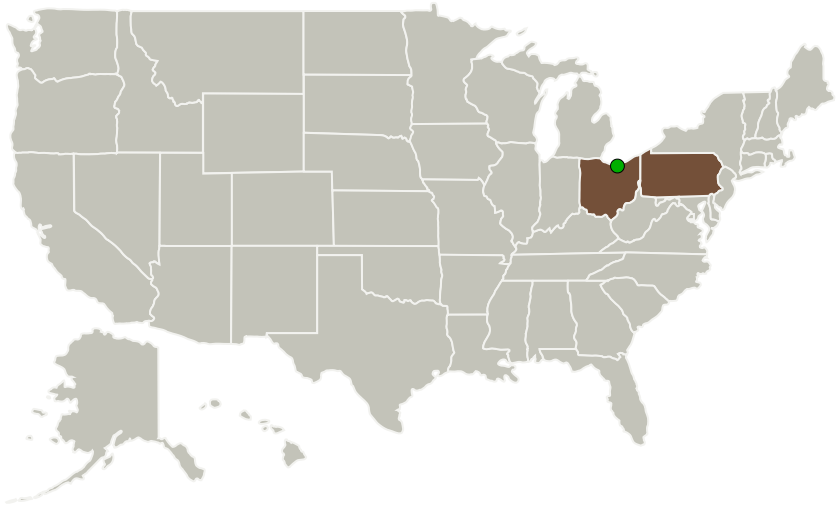
Additive Manufacturing of Heat Pipe Wicks, Phase I

Completed Technology Project (2014 - 2014)

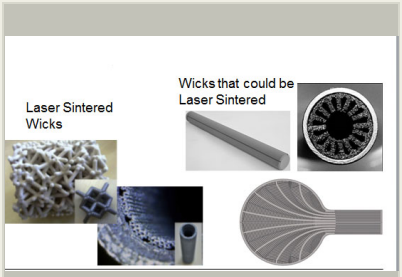
Project Introduction

Wick properties are often the limiting factor in a heat pipe design. Current technology uses conventional sintering of metal powders, screen wick, or grooves to fabricate realtively simplistic wick geometries. Additive manufacturing (laser sintering) of a porous structure would allow much greater freedom in defining the wick geometry and properties. One example is the RDU thermosyphon wick. Valuable real estate was consumed for a liquid reservoir for freeze/thaw tolerance. A more complex laser-sintered geometry could put the reservoir in the center, allowing greater evaporator area, lower heat flux, and lower DT. Another example is loop heat pipes, which are in limited use due to the cost. Laser sintering of an LHP directly in to the evaporator bodye could greatly lower cost, making LHP vaible for commercial use. Applying laser sintering to develop complex wick geometries can greatly extend heat pipe heat transport capabilities and lower cost.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Thermacore, Inc.	Lead Organization	Industry	Lancaster, Pennsylvania
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio



Additive Manufacturing of Heat Pipe Wicks Project Image

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Primary U.S. Work Locations	
Ohio	Pennsylvania

Project Transitions

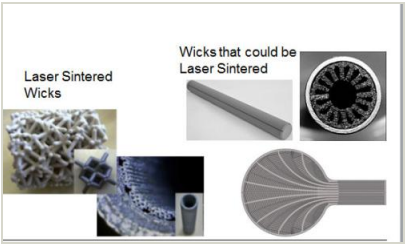
June 2014: Project Start

December 2014: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/137507)*

Images



Project Image
Additive Manufacturing of Heat Pipe Wicks Project Image *(https://techport.nasa.gov/image/129505)*

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Thermacore, Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

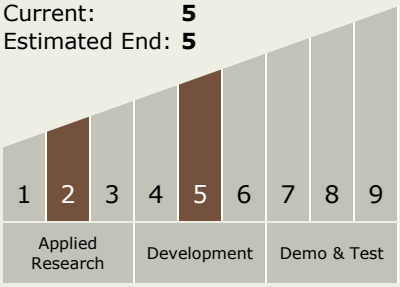
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
John Thayer

Technology Maturity (TRL)

Start: **2**
Current: **5**
Estimated End: **5**



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Completed Technology Project (2014 - 2014)

Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
  - TX03.1 Power Generation and Energy Conversion
    - TX03.1.4 Dynamic Energy Conversion

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System